the Earth emits an enormous amount of infrared radiation which adds clutter to the image; however, with the help of software algorithms, the Earth's background radiation can be filtered out of the detector signal (Fig. 6).

-- Summary --

The infrared region of the electromagnetic spectrum is an excellent band for detecting and tracking heated objects. The technology for utilizing the infrared region has advanced considerably, and today, advanced technology infrared detectors are ideal for military space based sensor systems.

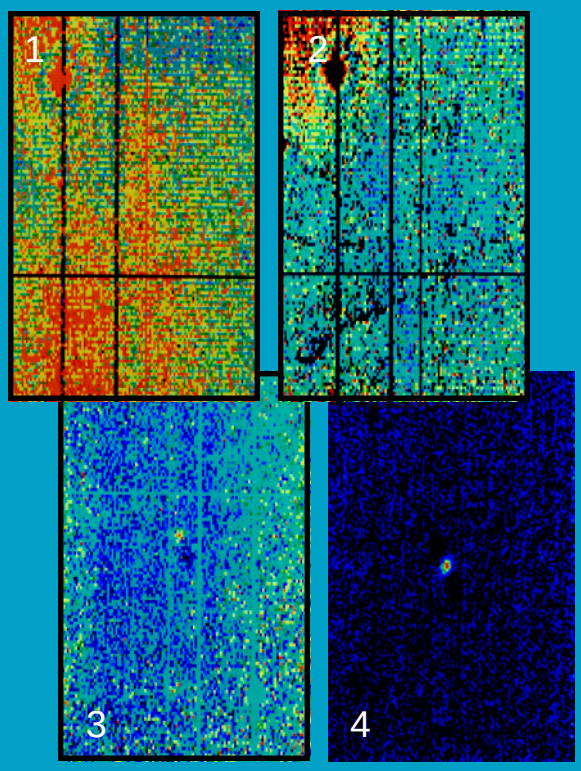

Fig. 6: Computer algorithms are used to eliminate noise and background from infrared focal plane data as shown here:

1. Raw focal plane data;
2. Infrared spikes subtracted;
3. Background subtracted;
4. Target acquisition

Brief History of Early Warning

Throughout history, military leaders have sought to gain the high ground advantage, and by doing this, commanders were able to survey large areas of the battlefield, watch enemy troop movements and guard against surprise attacks.

During medieval times, feudal lords built their castles on high hills, not only to look out upon their subjects, but also to secure the best battle position and to watch for approaching enemy forces. At the start of the American Revolutionary War, Paul Revere waited for the "one if by land, two if by sea" signal from the North Church tower before making his famous ride announcing the British invasion.

In early times, rulers built their castles on high ground to watch for enemy forces.

By the time of the American Civil War, balloons were being used for battlefield reconnaissance and strategic planning; however, these balloons were tethered and vulnerable targets for the enemy.

In 1903, the Wright brothers ushered in the aviation age. Military leaders were no longer constrained to surveying small areas at a time and didn't have to worry about weather conditions suitable for balloon operations. Securing the high ground took on a new meaning.

World War I was the first conflict to actively employ airpower, and this greatly increased a commander's field of view. Pilots were sent out with cameras to gather valuable intelligence on enemy positions, assess troop strengths and report on battle damage following attacks.

Improvements in technology following World War I pushed the high ground even higher, and improvements in radio communications made it